cause the institutional and legal framework for governing water development was inadequate to prevent the serious problems that now confront the state. In addition, basic data and hydrologic investigations were, and are, insufficient in scope and quantity to forecast, in any satisfactory way, the consequences of various alternative actions that might have been taken.

Mann's book is concerned primarily with the history and status of these administrative and legal results as they are affected by the desires and the consequent pressures of various parts of the total community. But, in addition, the author explains the programs, philosophies, and plans of the various state and federal bureaus whose work impinges on water questions. The politics of the situation are explained in discussing the history that has led to the present situation; but in some respects the title is a little misleading, for the present political attitudes and pressures are not explained with the same force and clarity used in describing the sequence of events in the past. This difference between the explanation of past events and the present situation is understandable, but some of the more interesting intricacies of the present political framework are perforce side-stepped by the author. This can also be seen in the discussion of the attitudes and policies of the state and federal bureaus, the description of which comprises nearly half of the volume.

On the whole, however, Mann is amazingly forthright. In dealing with a situation as complicated as the one that exists in Arizona, no author can be completely forthright and still maintain objectivity; many interpretations of present attitudes and policies could be made, but they depend on the point of view of the observer.

In view of the fact that this is the first book to deal with the politics of water, it is an extremely informative and a highly commendable venture, one that other States should emulate, for such books are much needed to educate the public about water problems. The author conveys to the reader a considerable insight into these complicated matters but nevertheless leaves him with a feeling that this is an objective analysis which attempts to present various points of view in as fair a light as possible. The book is highly recommended to all persons interested in water problems, both administrative personnel and scientific hydrologists, as well as to community groups interested in the use and development of resources.

It is obvious that a book of this kind cannot be completely up to date, for events proceed apace even while it is being written. However, it is quite distracting to find that portions of the book are up-to-date with respect to the Supreme Court decision on the California-Arizona suit [373 U.S. **546** (1963) Ariz. vs. Calif.], which was concerned with the use of Colorado River water, but that other parts of the book, which deal with the same subject, are not. It would have been better to present the situation as it was before the Supreme Court decision was rendered, or to rewrite the book uniformly so that all portions of the volume reflect the Court decision.

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Mathematical Surveys, No. 9

Linear Approximation. Arthur Sard. American Mathematical Society, Providence, R.I., 1963. xii + 544 pp. Illus. $16.80.

The theory of approximation discusses the problem of finding, for a given complicated function $f(x)$, a simple function $P(x)$, which can replace $f(x)$ with a small error. In the simplest case, $f(x)$ is a continuous function for $a \leq x \leq b$, while $P(x)$ is an algebraic or a trigometric polynominal of degree n. Originally approximation was identical with interpolation, but it became an independent discipline after Chebyshev (1958) and Weierstrass (1885) found their fundamental results about approximation by polynomials. At first only approximation of individual functions was studied, but the introduction of electronic computers was in part responsible for a change in attitudes. In present-day computation, one often has to deal with a great number of functions at the same time. It is then not possible or profitable to pay attention to the individual features that some of them may possess. Thus, mathematicians were led to the study of approximation questions for large classes of functions. For this purpose, Kolmogorov successfully introduced the notions of width and of entropy of sets of functions.

Where does the Sard's book fit into this development? In his monograph, Sard presents in great detail the results of his research. They lie on the borderline between theoretical and practical approximation. One of Sard's purposes is to find the "best" approximation formulas. His main idea is to come back to interpolation, but with fewer restraints than in the classical formulas. The error is a linear functional which contains some free parameters. Sard minimizes its norm in a certain Hilbert space. This gives the parameters and the approximation itself. The result is best for a class, not for individual functions. Many formulas are thus obtained; their connection with spline interpolation (de Boor, Schoenberg) was discovered only recently and, thus, could not be included.

The second part of the book deals with functions of several variables. Sard is able to avoid some of the difficulties inherent in the problem by adopting spaces of functions for which the different data (the partial derivatives involved) are in a certain sense independent. A further major part of the book presents the probabilistic theory of Wiener-Kolmogorov, augmented by Sard's own results. The practical usefulness and theoretical interest of Sard's formulas are clear.

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Mathematics

Homology. Saunders MacLane. Springer, Berlin; Academic Press, New York, 1963. x + 422 pp. Illus. $15.50.

Here is a masterly, comprehensive treatment of an exciting area in contemporary mathematics. From the most primitive, intuitive ideas of "boundary," there has evolved in the past 70 years a sophisticated mathematical machinery called "homology." Like the differential calculus, homology arose as a collection of techniques, later strengthened and enlarged by an intensive study of the underlying theory. The present book offers the reader a working knowledge of homology—in theory, in practice, and in relation to many other branches of mathematics.

The author covers this wide range of material thoroughly, bringing out the local color of the various fields he traverses. Algebraic structures are his raw materials; categories and functors

are introduced at first just for the convenience of their language; topological spaces provide a supply of illustrative examples. The book is further enriched by historical notes, interpretative remarks, and numerous exercises. Again and again the specific precedes the general, concepts being encountered in action and used before they are formalized; then general results are carried on to precise computational results. There is a corresponding emphasis on content in preference to form.

Homology can and will be used as a textbook which, for the student with adequate background, will provide a firm grounding in homology in the algebraic setting. Experienced topologists or algebraists will find here new tools and a road to the frontiers of research, as well as a ready reference for the basic "facts of life" in the subject. The book's most important function will be to facilitate communication between mathematicians, for an algebraist may roam at ease here and experience a new viewpoint on a familiar landscape, while the topologist may venture into a new world, reassured by the haunting familiarity of the basic machinery—homology.

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Plant Pathology

Biochemistry and Physiology of Plant Immunity. B. A. Rubin and Ye. V. Artsikhovskya. Translated from the Russian edition (Moscow, 1960) by Helen Wareing. Pergamon, London; Macmillan, New York, 1963. x + 358 pp. Illus. $14.

Most plants are resistant to most pathogens, but knowledge of the relatively few cases where given pathogens damage given crops makes up most of the literature on plant pathology. For 60 years much effort has been devoted to trying to detect chemical differences that would explain why some varieties of plants are susceptible but other varieties are resistant to the same pathogen. With perhaps two exceptions, these efforts have been unsuccessful. The futility of this approach may have been first indicated by Bernard about 1910. Acquired immunity in plants was not put on a firm basis till about 1959, with the work on phytoalexins started by Müller about 1939. As little as 10 years ago acquired immunity was considered of doubtful significance in plant pathology. It now appears that chemicals toxic to the pathogen and formed in host cells in response to preliminary invasion by the pathogen are a major cause of specific resistance, while much of the nonspecific resistance is due to phytoncides, antibiotic chemicals universally present in healthy plants.

Much of the literature leading to this conception is reviewed in this first book on the biochemistry and physiology of plant immunity by Rubin and Artsikhovskya, Russian leaders in work on phenols in relation to plant disease. The book consists of four chapters—24 pages on the evolution of parasitism, 59 pages on the biochemistry and physiology of heterotrophic organisms, 55 pages on the biochemistry and physiology of the diseased plant, and 140 pages on plant immunity. The first three chapters do not deal closely with immunity, and might almost as well be part of a book on the principles of plant pathology. The last chapter deals with the meat of the subject. Work on fungus diseases is emphasized, and the extensive studies of acquired immunity to viruses is largely omitted. Much is made of the differences in the biochemistry of resistance to obligate and to facultative parasites. Sources of information are thoroughly documented, but the validity and significance is not always adequately appraised. The 1086 references (796 non-Russian) adequately cover work in Russia, the United States, Japan, and England up to 1959. Of the 68 figures, mostly graphs, some (for example, Figs. 51 and 55) are not easily interpreted. The paper, printing, and binding are good, and errors are rare. This book emphasizes the fact that immunity is a problem of biochemical processes rather than chemical composition, and it is a credit to all concerned.

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Note

A Stone Age Society Today

In the fastness of highland New Guinea survive some of the last truly Stone Age societies of our time. The Kapauku speakers of Kamu Valley in West New Guinea (formerly Dutch New Guinea) are one of these survivals—at least, they were when Leopold Pospisil first studied them in 1954. *The Kapauku Papuans of West New Guinea* (Holt, Rinehart, and Winston, New York, 1963. 114 pp. $1.50), by Pospisil, is a condensation of data that he has published in articles and two longer monographs. In this book the author deals with the Kapauku's economy, social and political organizations, law, warfare, and ceremonial life as it was just before the Dutch colonial government first extended their control over the valley.

The field work on which this study is based is a tour de force that will probably not be equalled in a New Guinea society of this sort. To the analysis Pospisil also brings a rare—among anthropologists, that is—sophistication in legal theory and a welcome penchant for documenting statements, wherever possible, with quantified data. For example, if anyone wishes to know what the gross national product and the balance of trade of this branch of the Kapauku are, it is here—in shells, the standard currency of the region. The author has also used precious space to explain many of the concepts he uses in his lucid analysis. All in all this is a salutary addition to the Case Studies in Cultural Anthropology Series, which is being published to provide aids for teaching cultural and social anthropology, for not only does it present a capital example of a stateless society in its unfettered state, but it is also a model of descriptive research.

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New Books

Biological and Medical Sciences

Acoustic Behaviour of Animals. R.-G. Busnel, Ed. Elsevier, New York, 1963. 953 pp. Illus. $45.

Advances in Acarology. vol. 1. John A. Naegele, Ed. Cornell Univ. Press, Ithaca, N.Y., 1963. 492 pp. Illus. $9.75.

Advances in Biochemistry. Proceedings of the Summer School in Biochemistry, 1962. P. S. Sarma, Ed. Indian Inst. of Science, Bangalore, 1963. 459 pp. Illus. $5. More than 40 papers based on the lectures presented by participants at the school, which was sponsored by the Ministry of Scientific Research and Cultural Affairs.

Advances in Biological Waste Treat-

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